UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/693,209	10/24/2003	Ming-Chin Chang	250122-1040	2288

24504 7590 09/20/2005

THOMAS, KAYDEN, HORSTEMEYER & RISLEY, LLP
100 GALLERIA PARKWAY, NW
STE 1750
ATLANTA, GA 30339-5948

EXAMINER	
VU, PHU	

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 09/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

Office Action Summary	Application No.	Applicant(s)	
	10/693,209	CHANG ET AL.	
	Examiner	Art Unit	
	Phu Vu	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 June 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 1-4, and 8-10 are rejected under 35 U.S.C. 103(a) as being obvious over Rho et. al US PG Publication No. 2004/0080684 and further in view of Watanabe et. al US Patent No. 6573969 and further in view of Gu et al US Patent No 5920084.

Regarding claims 1 and 3, Rho teaches a transflective a liquid crystal display device implementing a color filter having various thicknesses, comprising: a lower substrate (fig. 2 element 10) having an insulating layer (fig. 2 element 70) thereon; a lower electrode formed on the insulating layer, wherein the lower electrode has a transmissive portion(fig. 2 element 82) and a reflective portion (fig. 2 element 92); an upper substrate (fig. 2 element 100) opposing the lower substrate, wherein a side of the upper substrate has a color filter having a first thickness portion and a second thickness portion, the first thickness portion (fig. 2 element 134) is thicker than the second

thickness portion (fig. 2 element 132), and the first thickness portion corresponds to the transmissive portion (fig 2 "T" region) and the second thickness portion corresponds to the reflective portion (fig. 2 "R" region) and a liquid crystal layer (area of "T" and "R" regions of fig. 2) interposed between the upper substrate and the lower substrate.

Rho fails to teach a planarization layer formed on the color filter, wherein the planarization layer is opposite to the lower substrate nor an upper electrode formed on the planarization layer and a planarization layer formed of a transparent planarization layer of BCB or acryl resin however Rho does teach an upper electrode formed on the color filter. Watanabe teaches a liquid crystal display with a planarization layer between the color filter and upper electrode create a smooth surface (see column 6 lines 43-45). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to implement a planarization layer between the color filter and electrode layer to create a smooth surface. Kim teaches a planarization layer formed of BCB as having a good leveling property (see column 1 line 67-column 2 line 1), which is transparent by applicant's own admission (see claim 3). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in art to use a BCB planarization layer because of its good leveling properties.

Regarding claims 2, The reference teaches the thin color resist layer (fig. 3C element 134) formed by removing part of the thick color resist layer in (fig. 3C element 132).

Additionally claim 2 recites a product by process limitation:

The MPEP section 2113 [R-1] states:

element 132), and the first thickness portion corresponds to the transmissive portion (fig 2 "T" region) and the second thickness portion corresponds to the reflective portion (fig. 2 "R" region) and a liquid crystal layer (area of "T" and "R" regions of fig. 2) interposed between the upper substrate and the lower substrate.

Rho fails to teach a planarization layer formed on the color filter, wherein the planarization layer is opposite to the lower substrate nor an upper electrode formed on the planarization layer and a planarization layer formed of a transparent planarization layer of BCB or acryl resin however Rho does teach an upper electrode formed on the color filter. Watanabe teaches a liquid crystal display with a planarization layer between the color filter and upper electrode create a smooth surface (see column 6 lines 43-45). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to implement a planarization layer between the color filter and electrode layer to create a smooth surface. Kim teaches a planarization layer formed of BCB as having a good leveling property (see column 1 line 67-column 2 line 1), which is transparent by applicant's own admission (see claim 3). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in art to use a BCB planarization layer because of its good leveling properties.

Regarding claims 2, The reference teaches the thin color resist layer (fig. 3C element 134) formed by removing part of the thick color resist layer in (fig. 3C element 132).

Additionally claim 2 recites a product by process limitation:

The MPEP section 2113 [R-1] states:

PRODUCT-BY-PROCESS CLAIMS ARE NOT LIMITED TO THE MANIPULATIONS OF THE RECITED STEPS, ONLY THE STRUCTURE IMPLIED BY THE STEPS The structure implied by the process steps should be considered when assessing the patentability of product-by-process claims over the prior art, especially where the product can only be defined by the process steps by which the product is made, or where the manufacturing process steps would be expected to impart distinctive structural characteristics to the final product. There does not appear to be any additional structure implied by the steps which is not obvious therefore claim 2 is rejected over the reference because it is a product by process limitation.

Regarding claim 4, the reference teaches the color resist layer as a negative photoresist (see [0016]).

Regarding claim 8, the primary reference teaches a layer comprises the negative photoresist (see [0016]), further comprising: an exposure light and a photomask (fig. 3B element 200) for performing a photolithography procedure on the thick color resist layer to remove part of the thick color resist layer in the second region; wherein the photomask comprises: a first pattern for transmitting the exposure light to the first region (fig. 3B Area A); and a second pattern for decreasing an intensity of the exposure light penetrating the second pattern, corresponding to the second region (fig. 3B Area C).

Regarding claims 9 and 10, these claims are directed toward product by process claims (see rejection of claim 2). The limitations of claims 9 and 10 do not appear to lend any additional structure to the LCD device as they are directed at the

structure of an object to make the device. Also area C [0064], disclosed by the primary reference teaches a halftone pattern, as the applicant discloses a half-tone pattern is used to reduce the intensity of the light, which is also the same use as in the prior art. It is noted that Area C would still be the same for positive and negative photolithography techniques. The lattice structure in [0064] is considered to be a micro-pattern.

Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rho et. al. and Watanabe as applied to claim 4 above, and further in view of Endo et. al US Patent No. 6033813 and Nishikawa et. al. US Patent No. 6,426,166.

Regarding claim 5, Rho and Watanabe teach all the limitations of claim 5, except a positive photoresist further comprising: an exposure light and a photomask for performing a photolithography procedure on the thick color resist layer to remove part of the thick color resist layer in the second region; wherein the photomask comprises: a first pattern for shading the first region from the exposure light; and a second pattern for decreasing an intensity of the exposure light penetrating the second pattern, corresponding to the second region. Endo teaches a positive photo-resist material for color filters having a fine pattern (see column 2 lines 60-65). Rho also teaches an exposure light and a photomask for performing a photolithography procedure on the thick color resist layer to remove part of the thick color resist layer in the first region; wherein the photomask comprises: a first pattern for shading the first region from the exposure light; and a second pattern for decreasing an intensity of the exposure light penetrating the second pattern, corresponding to the first region. Rho's processes however apply to a negative photoresist. However, a positive photo-resist process is

obvious over a negative process as it merely requires usage of a positive photoresist material, as disclosed by Endo, and to reverse the light transmitting portions to fully block light and blocked portions of the mask to fully expose light. Nishikawa teaches a positive photoresist process where this is the case (see fig. 1A – 1E). While the photolithography process taught by Nishikawa applies to a photoresist formed on top of the color filters this difference does not matter as Nishikawa is only applied to show obviousness of a photomask used with a positive photoresist. Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use a positive photoresist color filter to make a fine color filter and use positive photolithography techniques as required by the positive photoresist material.

Regarding claim 6 and 7, these claims are directed toward product by process claims (see rejection of claim 2). The limitations of claims 6 and 7 do not appear to lend any additional structure to the LCD device as they are directed at the structure of an object to make the device. Also area C [0064], disclosed by the primary reference teaches a halftone pattern, as the applicant discloses a half-tone pattern is used to reduce the intensity of the light, which is also the same use as in the prior art. It is noted that Area C would still be the same for positive and negative photolithography techniques. The lattice structure in [0064] is considered to be a micro-pattern.

Claim 11-14 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seki et. al US Patent No. 6633353 and further in view of Rho US PG Publication No. 2004/0080684 and Kuo et. al US Patent No. 6424397.

Regarding claims 11 and 13, Seki teaches a transflective liquid crystal display device comprising: a lower substrate (fig. 1element 101), a lower electrode (fig. 1 element 102), wherein the lower electrode has a transmissive portion and a reflective portion (see column 11 lines 17-34); a planarization layer formed on the color filter (fig. 1 element 106); an upper substrate opposing the lower substrate (fig. 1 element 201); an upper electrode formed (fig 1 element 207) on the upper substrate; and a liquid crystal layer interposed between the upper substrate and the lower substrate (fig. 1 element 50). Seki fails to disclose a color filter having various thicknesses formed on the lower electrode, wherein the color filter has a first thickness portion and a second thickness portion, the first thickness portion is thicker than the second thickness portion, and the first thickness portion corresponds to the transmissive portion and the second thickness portion corresponds to the reflective portion and Seki also fails to disclose an insulation layer between the lower electrode and the lower substrate. Rho teaches a color filter having a first thickness portion and a second thickness portion, the first thickness portion (fig. 2 element 134) is thicker than the second thickness portion (fig. 2 element 132), and the first thickness portion corresponds to the transmissive portion (fig 2 "T" region) and the second thickness portion corresponds to the reflective portion (fig. 2 "R" region) to obviate the color non-uniformity associated with a typical transflective LCD where reflected light passes through the color filter and liquid crystal layer twice and only once in transmissive mode (see [0008]). Kuo teaches an insulation layer (cover figure element 410) provided between the lower substrate (cover figure element 400) and the lower electrode to provide insulation for the electrode. Therefore, at the

time of the invention, it would have been obvious to one of ordinary skill in the art to combine a color filter having a first thickness portion and a second thickness portion with the transflective display of Seki to reduce color non-uniformity and also add an insulation layer between the lower substrate and lower electrode to provided insulation for the electrode. The references also fail to teach a transparent planarization layer of an organic resin such as BCB. Kim teaches a planarization layer formed of BCB as having a good leveling property (see column 1 line 67-column 2 line 1), which is transparent by applicant's own admission (see claim 3). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in art to use a BCB planarization layer because of its good leveling properties.

Regarding claim 12, Rho reference teaches the thin color resist layer (fig. 3C element 134) formed by removing part of the thick color resist layer in (fig. 3C element 132). This feature is met by the combination as the combination requires the thin color resist layer to operate therefore motivation follows that of claim 11.

Also claim 12 recites a product by process limitation (See MPEP 2113 [R-1]). There does not appear to be any additional structure implied by the steps which is not obvious therefore claim 12 is rejected over the references because it is a product by process limitation.

Regarding claim 13, the combination teaches all of the limitations of claim 3, except a planarization layer that is organic or inorganic. However this limitation is met as any planarization layer that is not organic is inorganic and any planarization layer that is not inorganic will be considered organic.

Regarding claim 14, the Rho teaches the color resist layer as a negative photoresist (see [0016]). Motivation to combine follows that of claim 11 rejection.

Regarding claim 18, the Rho reference teaches a layer comprises the negative photoresist (see [0016]), further comprising: an exposure light and a photomask (fig. 3B element 200) for performing a photolithography procedure on the thick color resist layer to remove part of the thick color resist layer in the second region; wherein the photomask comprises: a first pattern for transmitting the exposure light to the first region (fig. 3B Area A); and a second pattern for decreasing an intensity of the exposure light penetrating the second pattern, corresponding to the second region (fig. 3B Area C). Motivation to combine follows that of claim 11 rejection.

Regarding claims 19 and 20, these claims are directed toward product by process claims The limitations of claims 6 and 7 do not appear to lend any additional structure to the LCD device as they are directed at the structure of an object to make the device (see MPEP 2113 [R-1]).

Also area C [0064], disclosed by Rho reference teaches a halftone pattern, as the applicant discloses a half-tone pattern is used to reduce the intensity of the light, which is also the same use as in the prior art. It is noted that Area C would still be the same for positive and negative photolithography techniques. The lattice structure in

[0064] is considered to be a micro-pattern. Motivation to combine follows that of claim 11 rejection.

Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rho, Kuo, and Seki as applied to claim 14 above, and further in view of Endo et. al US Patent No. 6033813 and Nishikawa et. al. US Patent No. 6,426,166.

Regarding claim 15, Rho and Seki teach all the limitations of claim 5, except a positive photoresist further comprising: an exposure light and a photomask for performing a photolithography procedure on the thick color resist layer to remove part of the thick color resist layer in the second region; wherein the photomask comprises: a first pattern for shading the first region from the exposure light; and a second pattern for decreasing an intensity of the exposure light penetrating the second pattern, corresponding to the second region. Endo teaches a positive photo-resist material for color filters having a fine pattern (see column 2 lines 60-65). Rho also teaches an exposure light and a photomask for performing a photolithography procedure on the thick color resist layer to remove part of the thick color resist layer in the first region; wherein the photomask comprises: a first pattern for shading the first region from the exposure light; and a second pattern for decreasing an intensity of the exposure light penetrating the second pattern, corresponding to the first region. Rho's processes however apply to a negative photoresist. However, a positive photo-resist process is obvious over a negative process as it merely requires usage of a positive photoresist material, as disclosed by Endo, and to reverse the light transmitting portions to fully block light and blocked portions of the mask to fully expose light. Nishikawa teaches a

positive photoresist process where this is the case (see fig. 1A – 1E). While the photolithography process taught by Nishikawa applies to a photoresist formed on top of the color filters this difference does not matter as Nishikawa is only applied to show obviousness of a photomask used with a positive photoresist. Therefore, at the time of the invention, it would have been obvious to one of ordinary skill in the art to use a positive photoresist color filter to make a fine color filter and use positive photolithography techniques as required by the positive photoresist material.

Regarding claim 16 and 17, these claims are directed toward product by process claims (see rejection of claim 2). The limitations of claims 6 and 7 do not appear to lend any additional structure to the LCD device as they are directed at the structure of an object to make the device (see MPEP 2113 [R-1]).

Also area C [0064], disclosed by Rho reference teaches a halftone pattern, as the applicant discloses a half-tone pattern is used to reduce the intensity of the light, which is also the same use as in the prior art. It is noted that Area C would still be the same for positive and negative photolithography techniques. The lattice structure in [0064] is considered to be a micro-pattern. Motivation to combine follows that of claim 11 rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phu Vu whose telephone number is (571)-272-1562. The examiner can normally be reached on 8AM-5PM M-F.

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phu Vu whose telephone number is (571)-272-1562. The examiner can normally be reached on 8AM-5PM M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Kim can be reached on (571)-272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Phu Vu
Examiner
AU 2871

DUNG T. NGUYEN
PRIMARY EXAMINER